

# How Important Are Dedicated Research Years and Global Health to Applicants in Plastic Surgery?

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**Background:** Applicant preferences for required research and global surgery experiences during plastic surgery training have not been previously studied.

**Methods:** An anonymous survey was sent to integrated plastic surgery applicants from consecutive residency application cycles (2018–2020). Research and global health experiences before residency were elicited, along with the interest to continue these activities. Data were analyzed using frequency distributions and chi-square test of independence.

**Results:** Seventy-eight former plastic surgery applicants responded to the survey (15.7% response rate). Most participants (65%) viewed time for research as important when evaluating residency programs. Fewer respondents (10%) ranked programs with a required research year higher, whereas 47% ranked those programs lower and 43% did not factor it into their decision-making. Less than one-third of respondents (28%) reported prior global health experience, yet 44% viewed international opportunities as an important factor when ranking programs, and the majority (72%) stated plans to participate in global surgery during residency. Past experience on a global health trip predicted a strong preference for longer rotations ( $P = 0.003$ ) and willingness to use vacation time to participate during residency ( $P < 0.001$ ).

**Conclusions:** Research was an important consideration in residency selection, but a few preferred a residency program with a dedicated research year. Although applicants had limited experience with global surgery, the majority intended to get involved during residency. Understanding factors that influence applicants' interests in residency programs may better equip programs with information to create enriching experiences and attract the most qualified applicants. (*Plast Reconstr Surg Glob Open* 2022;10:e4262; doi: [10.1097/GOX.0000000000004262](https://doi.org/10.1097/GOX.0000000000004262); Published online 14 April 2022.)

## INTRODUCTION

Integrated plastic surgery residency programs continue to attract high-achieving and accomplished applicants in the National Resident Matching Program each year.<sup>1,2</sup> The Accreditation Council for Graduate Medical Education (ACGME) uses set criteria during the process of credentialing plastic surgery residency programs. These criteria include required clinical rotations, the length of

those rotations, and a minimum number of cases that must be completed during clinical rotations. International rotations and dedicated research years beyond the minimum criteria are not required for residency credentialing. However, residency applicants may evaluate the access that a residency program offers to pursue the latter two criteria when making residency selection. Therefore, the current article explores the importance of these two educational commitments on the criteria that resident applicants use when selecting their residency program, even though these educational commitments are not required in the ACGME credentialing process. The present study specifically evaluated two critical criteria that are variably offered by plastic surgery residency programs: (1) dedicated research years beyond the core ACGME requirements for specialty accreditation, and (2) formal global health exposure offered by the residency program. Many articles have outlined the factors that make applicants more successful

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in the match, but few have focused on those factors that are not part of the core requirements set by the ACGME that these competitive applicants consider when deciding between plastic surgery residency programs.<sup>3–5</sup>

Several integrated plastic surgery residency programs require a research year, whereas others support but do not mandate a research year.<sup>6</sup> Similar to required research time, there is no standard residency requirement for international rotations. Nonetheless, short-term global surgery experiences are becoming increasingly common in plastic surgery residency programs, as more programs integrate optional international rotations into their curricula.<sup>7,8</sup> Programs with international rotations incorporated into the residency curricula count the cases abroad toward annual case logs, whereas those that do not require residents to participate in international work during vacation time. We define those rotations that are not part of the residency curricula as “decoupled rotations.”

Here we investigate applicants’ perceptions of two elements that are not part of the Residency Review Committee requirements in their selection of a plastic surgery residency: (1) research year(s) and (2) formal international rotations incorporated into the curriculum.<sup>9–11</sup> We sought to understand plastic surgery applicants’ interests and motivations on a granular level to ascertain factors that may influence preference during the match and future interest in research or international-related activities. The results of our study will draw conclusions about how students view these educational opportunities and may provide suggestions for training programs to incorporate them into their curricula.

## METHODS

In September 2020, an anonymous survey was distributed using Qualtrics software (Qualtrics, Provo, Utah) to former integrated plastic surgery applicants to assess their interest in research and global health opportunities during residency.<sup>12</sup> (See document, Supplemental Digital Content 1, which shows the Integrated Plastic Surgery Residency Characteristics Impacting Medical Students’ Choice of Program survey. <http://links.lww.com/PRSGO/B996>.) A list of contact emails of all applicants who applied during two sequential integrated plastic surgery residency application cycles (2018–2019 and 2019–2020) was collated and consolidated by the authors. Of the 505 emails, nine were no longer active, resulting in 496 unique, eligible email addresses. The survey assessed (1) research experience before residency, (2) opinion of required research year(s) during residency, (3) experience with global health before residency, and (4) importance to the applicant concerning global health rotations during residency. This research study was reviewed and found to be exempt by the institutional review board of Northwestern University Feinberg School of Medicine.

Demographic information was collected, including applicants’ gender identity, racial and ethnic group, medical degree type, medical school, application cycle during which they applied, success in the match, and plans to reapply for those who did not match. Data were entered into IBM SPSS (version 27; Armonk, N.Y.) to perform descriptive and inferential statistics.<sup>13</sup> Chi-square

## Takeaways

**Question:** This study evaluated residency applicants’ preferences for required research and international surgery experiences during training.

**Findings:** Plastic surgery residency applicants do not report ranking residency programs with a dedicated research year higher on their match lists, while most consider global surgery an asset to their training with intentions to get involved.

**Meaning:** Understanding the extracurricular factors in required research year(s) and global health that influence residency choices can better inform programs to develop enriching training environments and attract the most qualified candidates.

test of independence determined significant associations between categorical variables, and statistical significance was defined as a *P* value less than or equal to 0.05.

## RESULTS

Of the 496 potential respondents, 78 completed the survey in its entirety, yielding a 15.7% response rate (Table 1). Students from 52 distinct medical schools replied (98.7% allopathic students, 1.3% osteopathic students). The majority of survey participants applied during the 2019–2020 application cycle (29.5% in 2018–2019, 70.5% in 2019–2020). Survey responses indicated that 88.5% of participants matched during their respective application cycle, whereas 11.5% did not match. Of those who did not match, 55.6% were considering re-applying to integrated plastic surgery residency during the following cycle.

### Research

Before medical school, 17.9% reported holding a research-related master’s degree, and 30.8% completed at least one gap year after college to pursue research (Table 2).

**Table 1. Demographic Characteristics of Survey Respondents (n = 78)**

Characteristic	n (%)
Gender identity	
Men	41 (52.6)
Women	37 (47.4)
Racial and ethnic group	
Asian	16 (20.5)
Black or African American	2 (2.6)
Hispanic, Latino, or Spanish origin	3 (3.8)
Middle Eastern or North African	5 (6.4)
White	50 (64.1)
Other	2 (2.6)
Application cycle	
2018–2019	23 (29.5)
2019–2020	55 (70.5)
Matched in integrated plastic surgery residency	
Yes	69 (88.5)
No	9 (11.5)
Plans to reapply to integrated plastic surgery (n = 9)	
Yes	5 (55.6)
No	4 (44.4)

**Table 2. Summary of Survey Responses Pertaining to Research before Residency**

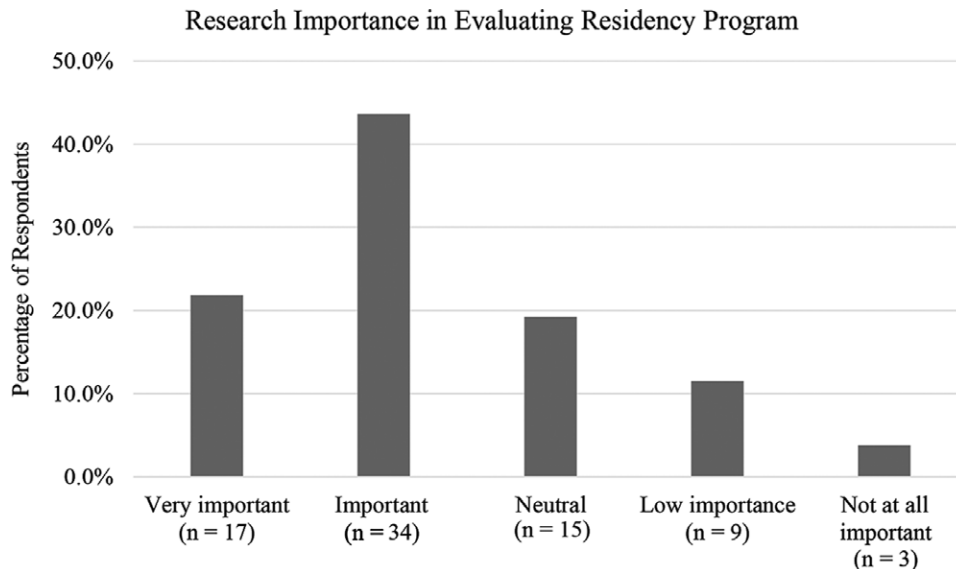
Research-related Advanced Degree (n = 14)	n (%)
Master's degree	13 (16.7)
Other (including PhD)	1 (1.3)
<b>No. Dedicated Research Years Before Medical School (n = 22)</b>	<b>n (%)</b>
1 y	11 (14.1)
2 y	4 (5.1)
3 y	2 (2.6)
4 y	4 (5.1)
5 y	1 (1.3)
<b>Opinion of Dedicated Research Years (n = 22)</b>	<b>n (%)</b>
Found it useful and would do it again	14 (58.3)
Would consider doing it again	3 (12.5)
Would not do it again	3 (12.5)
Indifferent	2 (8.3)
<b>Medical School Research Requirement (n = 78)</b>	<b>n (%)</b>
Yes	26 (33.3)
No	52 (66.7)
<b>Dedicated Research Year(s) During Medical School (n = 78)</b>	<b>n (%)</b>
Yes	25 (32.1)
No	53 (67.9)
<b>Reason for Dedicated Research Year During Medical School (n = 25)</b>	<b>n (%)</b>
Perceived competitiveness of integrated plastic surgery residency	9 (36)
Developed late interest in plastic surgery	6 (24)
Personal interest in research	6 (24)
Other	4 (16)
<b>Average no. peer-reviewed publications (n = 78)</b>	<b>8.4±9.3</b>

Of those who took a research gap year, approximately 45.8% completed one year of research during that time. Among the entire research cohort, 58.3% “found it useful and would do it again,” 12.5% “would consider doing it again,” 12.5% “would not do it again,” and 8.3% felt “indifferent.” One salient narrative response described this research time as “useful if organized and structured correctly. But most research opportunities in my experience have not been

educational. Mentors have all been well-intentioned, but not a great resource overall. I’ve done two research years...it is a significant opportunity cost. However, it is a tremendous asset to gain admission into a medical school and potentially residency.”

During medical school, approximately 33.3% of participants were required to take a research elective or write a thesis or article for publication by graduation, and 32.1% completed at least one dedicated research year before graduation. Reasons for taking time off during medical school to perform research included “perceived competitiveness (wanted to increase chances of matching into plastics program)” (36%), “developed late interest in plastic surgery” (24%), “personal interest in research” (24%), and other reasons (16%). Of those who took dedicated time off for research, 72% “found it useful and would do it again,” 12% “would consider doing it again,” 13% “would not do it again,” and 3% chose to do it following an unsuccessful application cycle.

When considering residency programs, participants viewed time for research as very important (21.8%), important (43.6%), neutral (19.2%), low importance (11.5%), and not at all important (3.8%) (Fig. 1). If a residency program requires a research year during residency, 10.3% of participants would rank those programs higher on their match list, but 47.4% would rank research year programs lower (Table 3). Moreover, 42.3% of participants were neutral about a required research year and would not factor it into their rank list. Among those survey respondents that would rank research year programs higher, reported reasons for doing so included, “a strong foundation for a career in academic medicine” (75%), “to prevent resident burnout” (12.5%), or “to pursue other interests” (12.5%). Conversely, reasons for preferring a program without a required research year included “extended time in residency training/resident compensation” (32.4%), “being able to concurrently perform research during clinical training” (32.4%), “belief that a full-time research year will not impact



**Fig. 1.** The importance of dedicated research year(s) on plastic surgery applicants’ rank list.

**Table 3. Respondents Reported Interest in Research during Residency**

	n (%)
<b>Plans to Rank Programs with Required Research Year(s) Higher (n = 78)</b>	
Yes	8 (10.3)
No	37 (47.4)
Neutral, not a factor	33 (42.3)
<b>Reason for Preferring a Program with Required Research Year(s) (n = 8)</b>	
Strong foundation in academic medicine	6 (75.0)
Prevent resident burnout	1 (1.3)
Pursue other interests	1 (1.3)
<b>Reason for Preferring a Program without Required Research Year(s) (n = 38)</b>	
Extended time in residency training/resident compensation	13 (34.2)
Able to concurrently perform research during clinical	12 (31.6)
<b>Training</b>	
Belief that a full-time research year will not impact future professional opportunities	7 (18.4)
Insufficient research interest	5 (13.2)
Other	1 (1.3)
<b>Interest in Conducting Extracurricular Research During Residency (n = 78)</b>	
Yes	71 (91.0)
No	7 (9.0)
<b>Type of Research Interests During Residency (n = 71)</b>	
Bench/basic science	3 (4.2)
Clinical	68 (95.8)
<b>Interest in an Academic Career (n = 78)</b>	
Yes	33 (42.3)
No	7 (9.0)
Unsure	38 (48.7)

**Table 4. Summary of Survey Responses Pertaining to International Rotations before and during Medical School and Residency**

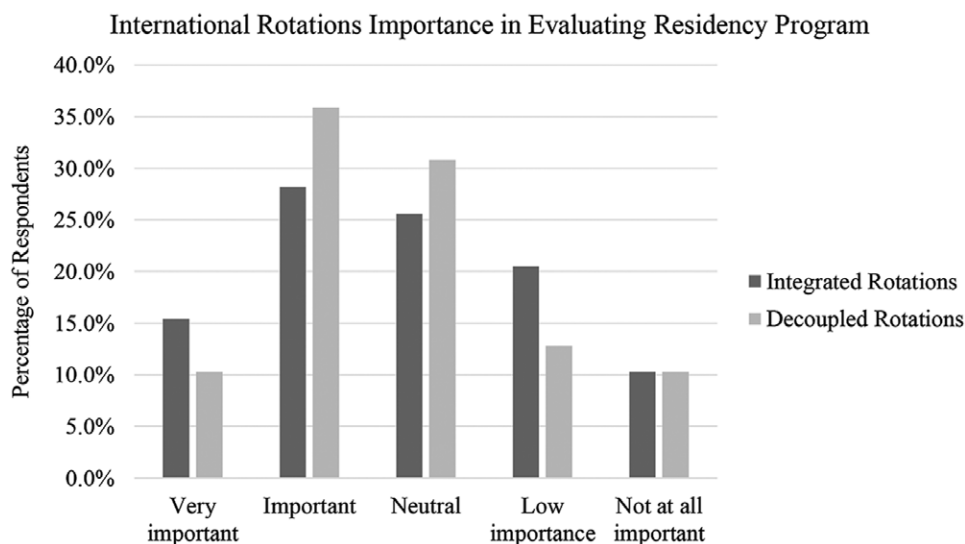
Category	n (%)
<b>Global health trip(s) before medical school</b>	
Yes	29 (37.2)
No	49 (62.8)
<b>Global health trip(s) during medical school</b>	
Yes	22 (28.2)
No	56 (71.8)
<b>Interest in international rotations during residency (n = 78)</b>	
Yes	56 (71.8)
No	7 (9.0)
Unsure	15 (19.2)
<b>Willingness to use vacation time for international rotations (n = 78)</b>	
Yes	47 (60.3)
No	31 (39.7)
<b>Duration sought for international rotations during residency (n = 71)</b>	
1–3 wk	31 (43.7)
4wk or more	18 (25.4)
Indifferent	22 (31.0)

future professional opportunities” (18.9%), “insufficient research interest” (13.5%), and “other” reasons (2.7%). Nonetheless, the majority of respondents (91%) reported that they planned to participate in extracurricular research outside their clinical duties without spending additional time in residency, and most (95.8%) planned to seek clinical research opportunities, as opposed to basic science (4.2%). Regarding future career paths, 42.3% reported an interest in academic medicine, 48.7% were undecided about their path at the time of survey completion, and 9% reported that they do not plan to pursue academic medicine.

**International Rotations**

Approximately 37% of survey respondents participated in a global health trip before medical school,

28.2% participated during medical school, and 16.7% participated both before and during medical school (Table 4). Respondents perceived international rotations that are integrated into the residency curriculum (ie, cases counting toward ACGME or residency requirements) as very important (15.4%), important (28.2%), neutral (25.6%), low importance (20.5%), or not at all important (10.3%) (Fig. 2). Participants viewed optional international rotations (ie, cases do not count toward ACGME, or residency requirements and residents may have to utilize vacation time for a global health trip) as very important (10.3%), important (35.9%), neutral (30.8%), low importance (12.8%), or not at all important” (10.3%). Approximately 71.8% of participants stated they would like to participate in a global health



**Fig. 2.** The importance of integrated and decoupled international rotations on plastic surgery applicants' rank list.

rotation during residency, 19.2% were unsure, and 9% reported no interest. Notably, of those who were interested or unsure, 60.3% agreed that they would use vacation time to participate if international rotations were not part of the residency curriculum ( $P < 0.001$ ). In contrast, the group of respondents who felt international rotations were “not at all important” in determining the order of their rank list were found to be less likely to use vacation time toward an international medical trip ( $P = 0.004$ ).

Regarding duration of international rotations, participants reported that they would prefer rotations that are 1–3 weeks in length (43.7%), 4 weeks or more (25.4%), or were indifferent about the duration of an international rotation (31.0%). Chi-square test of independence revealed that those who viewed formal international rotations incorporated into the curriculum as very important, important, or neutral in their residency selection were more likely to prefer a rotation duration of 4 weeks or more ( $P = 0.003$ ), to feel indifferent about their preferences for the duration of the rotation ( $P = 0.003$ ), or to prefer a rotation duration between 1 and 3 weeks ( $P < 0.001$ ), respectively. Participants who went on a global health trip before medical school were more likely to prefer a longer rotation of 4 weeks or more in residency, whereas those who did not participate before medical school were more likely to prefer a shorter rotation of 1–3 weeks ( $P = 0.036$ ). Similar preferences for longer rotations during residency were found for those who participated in global health rotations during medical school ( $P = 0.028$ ). With respect to the rank list, respondents who participated in a global health trip before or during medical school were more likely to consider international rotations incorporated into a residency curriculum as very important, whereas those who did not participate reported that this integrated opportunity was neutral or of low importance when compiling their rank list ( $P = 0.007$ ).

## DISCUSSION

There is a growing trend to advance the field of plastic and reconstructive surgery through research and global health.<sup>14</sup> Although seemingly disparate missions, establishing a career as a surgeon scientist or as a global surgeon require perseverance and dedication to innovation, education, and partnership. However, individuals who have not established a foothold in research or in global surgery during residency may find it difficult to initiate these activities as a newly minted attending.<sup>15</sup> Without increasing awareness and experience at the residency level, the number of surgeons available to engage in academic global surgery will remain limited, as will the progress and achievements in these arenas.<sup>15</sup>

Wackerbarth et al showed within general surgery that residency programs do not effectively communicate global surgery opportunities to prospective residents.<sup>14</sup> The lack of transparency related to international rotations in general surgery residency is representative of the inconsistencies and lack of knowledge surrounding dedicated research time and international rotations in other surgical subspecialties, such as in plastic and reconstructive surgery.<sup>14</sup> Short-term academic global health experiences are becoming increasingly common in plastic surgery residency programs; however, little standardization exists with respect to the structure of the rotations, case logs, and vacation time.<sup>7,8</sup> In an effort to promote standardization of required research time and international rotations incorporated into the residency curriculum, we surveyed former plastic surgery applicants to derive interest, enthusiasm, and support of these activities at the residency level.

### Research

Although respondents who participated in full-time research before or during medical school reported finding their experiences valuable, responses revealed that initial motivation for dedicated research was intended to create a more competitive candidacy for admissions into

desired programs and is not necessarily representative of a commitment to research. Although most respondents expressed an interest in participating in research during residency, this interest is likely due to positive experiences from past research activities, rather than a drive to pursue an academic career, as revealed by the low percentage of respondents who stated interest in a future career in academia. Our speculation is congruent with a study highlighting trends in plastic surgery trainee interest in academic medicine during residency and fellowship.<sup>16</sup> Trainees' interest in academic medicine has been shown to decrease as residents progress through residency, demonstrating that 95% of plastic surgery fellowship applicants were interested in academia before fellowship, yet 34% of graduates joined a private practice within 5 years of completing subspecialty training.<sup>16</sup>

Assessing how applicants view residency programs has been a particularly interesting topic for faculty involved in graduate medical education.<sup>4,17</sup> Specifically, within plastic surgery, research has historically been an important aspect of residency programs that applicants consider when creating their rank list.<sup>4,17</sup> This was further confirmed by our study with most respondents reporting that research was either a very important or important aspect when evaluating plastic surgery programs. The seemingly contradictory report of applicants' stated desire to participate in research during residency and their aforementioned driving motivation of becoming a competitive plastic surgery applicant may help predict the actual level of interest in research among the plastic surgery applicant pool. It is likely that applicants possess a certain level of interest in research based on their past experiences but perhaps not to the degree of pursuing academic careers. Indeed, this theory is supported by the very small minority of applicants in our study that would actively rank programs that required a research year higher on their match list. However, the popular reasons for ranking these programs lower, stated as "extended time in residency training/resident compensation," may be explained by many students having already taken time off before residency to pursue full-time research.

Further exploration into understanding applicants' preferences for a residency program with a required research year may reveal deeper insights and better equip programs to design productive research curricula. Future study could provide this information by surveying residents who matched at research year programs and comparing responses from those who have and have not completed the research requirement at any given time.

### International Rotations

The structure of international rotations varies across residency programs in the United States.<sup>7,18</sup> The approval process for a rotation often requires approval from an institution's designated institutional officer at the local level and subsequent approval from the ACGME and American Board of Plastic Surgery at the national level.<sup>6,11</sup> Programs that are able to offer approved rotations possess a competitive advantage given that nearly half of participants reported international rotations as a very important or

important aspect of residency. Our results demonstrated that those who participated in an international medical trip before residency will not only seek participation during residency but will also prefer a relatively longer time abroad (>4 weeks). Should these trends continue, our findings suggest that international medical work during residency may positively influence one's future career goals.

Overall, the results of our study suggest participants prioritize international rotation opportunities when creating their rank list, as nearly three-fourths of all applicants reported an interest in participating during residency. Moreover, the high degree of interest among those who seek participation during residency is further supported by the nearly two-thirds who reported a willingness to use vacation time for global surgery if rotations were decoupled from the curriculum. Based on these results, it may become increasingly important for programs to highlight their international rotations during the application cycle and further expand international opportunities, as global health interest potentially increases over time. This should further encourage programs to work toward incorporating approved international rotations into the residency curriculum or the equivalent to make it easier for residents to participate. Additionally, integrated international rotations may come with the added benefit of reducing resident burnout, as residents would not need to utilize vacation time to experience global surgery.<sup>19</sup> Future studies may seek to understand the perspectives of residents and attendings who have participated in international surgical work to determine its impact on both immediate and future career goals.

While it is not entirely surprising that both research and international work before and during medical school were correlated with an interest in these activities during residency, it does suggest that positive experiences during one's training can have a formative impact on one's long-term career goals and should be considered when refining the goals of a curriculum. For example, in the face of an ongoing need for plastic and reconstructive surgeons globally, particularly in low and middle income countries, integrating international rotations into a plastic surgery residency curricula may redirect interests of trainees and is perhaps one way to address this global shortage.<sup>20</sup> Moreover, although dedicated research time and/or international rotations may extend the life of a trainee, these experiences have been shown to incite a greater recognition of the surgical problems that afflict our patients and captivate residents by the merits of academic medicine, thereby delivering a substantial return on investment.<sup>21,22</sup>

An important limitation to highlight is the relatively low response rate (15.7%) given the 496 plastic surgery applicants who were surveyed from the two application cycles. However, this limitation is somewhat minimized, given that students from 52 different medical schools responded, representing about a quarter of all medical schools in the United States and perhaps an even greater proportion of medical schools with students applying to plastic surgery. Additionally, this

study did not survey whether former applicants were first-time applicants or reapplicants. This is minimized to a certain degree as we asked respondents if they applied in the consecutive application cycles (2018–2020). However, the study does not consider those who may have applied before 2018. Further insight could be gained from additional studies that assess reapplicant characteristics, including those that conducted a research year following an unsuccessful application cycle. Our study notes two such respondents who self-reported being placed in this category and have not yet reapplied at the time of the study.

## CONCLUSIONS

We explored plastic surgery applicants' interests in research and global surgery to determine their significance and influence on applicants' rank lists. Our results revealed that most applicants plan to seek research involvement during residency, albeit not a dedicated research year. We also elucidated that prior global health experience predicts involvement in relatively longer international rotations, irrespective of the need to utilize vacation time for these rotations. Our findings may be useful for applicants, as they seek programs with compatible interests in research and/or global surgery, as well as for program directors and the residency review committee to create enriching programs that train the most versatile plastic surgeons.

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